

# PATENT SPECIFICATION

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DRAWINGS ATTACHED.

Inventors :—CECIL WALTER LONGMAN and KENNETH JOHN RALLINGS COCKE.



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and 140, A(2N3 : 2N6 : 11D2 : 11E1 : 11H : 11K1 : 16B3 : 17).

International Classification :—B29d, f. F25d.

## COMPLETE SPECIFICATION.

### A Method of Moulding a Double-Walled Structure such as a Refrigerator Door.

We, PRESSED STEEL COMPANY LIMITED, a British Company, of Cowley, in the City and County of Oxford, do hereby declare the invention, for which we pray that a patent  
5 may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement :

This invention relates to double-walled structures such as doors and concerns  
10 particularly an insulated door for refrigerators. Its object is to provide a door of simple and inexpensive construction which has an attractive appearance.

A structure is produced by the method of  
15 this invention by placing inner and outer panels of one of the thermoplastic materials together and sealing around their peripheries, placing the assembly in a mould having upper and lower dies, heating the  
20 mould, deforming the panels into the dies by positive or negative air pressure and filling the space between the deformed panels with a heat insulant.

The mould is formed in two parts and may  
25 be heated in any manner desired.

The insulation may be in the form of a foaming resin which is poured into the space between the panels and allowed to foam *in situ* completely to fill such space, and thereby  
30 greatly to reinforce the panels.

In this way there is provided a strong door which requires no further treatment such as painting, and which has a pleasing and attractive appearance.

35 The invention will now be described with reference to the accompanying drawings.

Figure 1 is a view of the outside face of the door ;

Figures 2 and 3 are sections, respectively, on the lines 2—2 and 3—3 of Figure 1 ; 40

Figure 4 is a transverse section of the inner and outer panels of the door on the first stage of production ;

Figures 5 and 6 are transverse sections, showing the first and final stages of the  
45 forming operation in the forming dies ;

Figures 7, 8 and 9 are views, similar to Figures 4, 5 and 6 showing a modified arrangement ; and

Figures 10, 11 and 12 are section or part  
50 sections showing different forms of marginal joint for use with the arrangement of Figures 7 to 9.

As shown in Figures 1 to 6, inner and outer panels 11 and 12 are first placed together and  
55 welded, as at 13, around their margins. They are then placed between upper and lower dies 14 and 15, with their margins nipped firmly, and heat applied. This may be done in any  
60 convenient way and is not illustrated, but may be simply by heating the dies themselves, for example by steam heating, or by induction or other electrical heating.

When the panels are at the requisite temperature for ready deformation, air under  
65 pressure is admitted through pipe 16 and the panels blown up to the configuration of the dies. In Figure 6, is also shown an alternative method, i.e. by vacuum forming, a vacuum being drawn through the multiplicity of  
70 apertures 17.

After forming, the door is removed from the dies and for example a foaming insulant 18, is placed in the space between the panels, through a slot 19, which after the insulant  
75 has set, may be sealed in any desired manner.

In Figures 7, 8 and 9 is shown a modified arrangement, in which the outer panel 12a is given a preformed angular margin 20, and a series of blobs 25 or rolls of an insulant is placed between the panels before their margins are sealed. After sealing the margins, the heating of the panels causes the blobs to expand to fill the space between the panels.

The steps of heating and forming in the dies 14 and 15 then follows in the same way as described with reference to Figures 5 and 6.

In Figure 10, is shown an arrangement similar to Figure 7, but in this case, the outer panel 12b is dished and the margins intumed as at 21 to be sealed to the inner panel after the insertion of the insulant.

Figure 11 shows a similar arrangement, with the outer panel 12c having a right angled flange 22, whilst in Figure 12 the outer panel 12d has a simple flange 23 and the inner panel 11d is formed with a mating channel section margin 24.

#### WHAT WE CLAIM IS:—

1. A method of producing a double walled structure consisting of placing inner and

outer panels together and sealing around their margins, placing the assembly in a mould having upper and lower dies, heating the mould, deforming the panels into the dies by positive or negative air pressure and filling the space between the deformed panels with a heat insulant.

2. A method as claimed in Claim 1, in which one of the panels is given a pre-deformation and in the space between the panels is placed blobs or rolls of an insulant prior to forming in the mould.

3. A method as claimed in Claim 1, in which the panels are deformed in the mould by the vacuum forming process.

4. A double walled structure produced by the method claimed in Claims 1 to 3.

5. A method of producing a double walled structure substantially as described with reference to the accompanying drawings.

T. M. CONNELLY,

Chartered Patent Agent,

Agent for the Applicants.

#### PROVISIONAL SPECIFICATION.

#### A Method of Moulding a Double-Walled Structure such as a Refrigerator Door.

We, PRESSED STEEL COMPANY LIMITED, a British Company, of Cowley, in the City and County of Oxford, do hereby declare this invention to be described in the following statement:—

This invention relates to double-walled structures such as doors and concerns particularly an insulated door for refrigerators. Its object is to provide a door of simple and inexpensive construction which has an attractive appearance.

A structure is produced by the method of this invention by taking two flat sheets of one of the thermoplastic or thermosetting synthetic resin materials, sealing them together around their peripheries except for a small gap, placing in a mould, heating the mould, applying air under pressure through the gap or applying a vacuum to the exterior surface

to cause the panels to conform to the mould, removing the formed door and charging the space between the panels with a heat insulating material.

The mould is formed in two parts and may be heated in any manner desired.

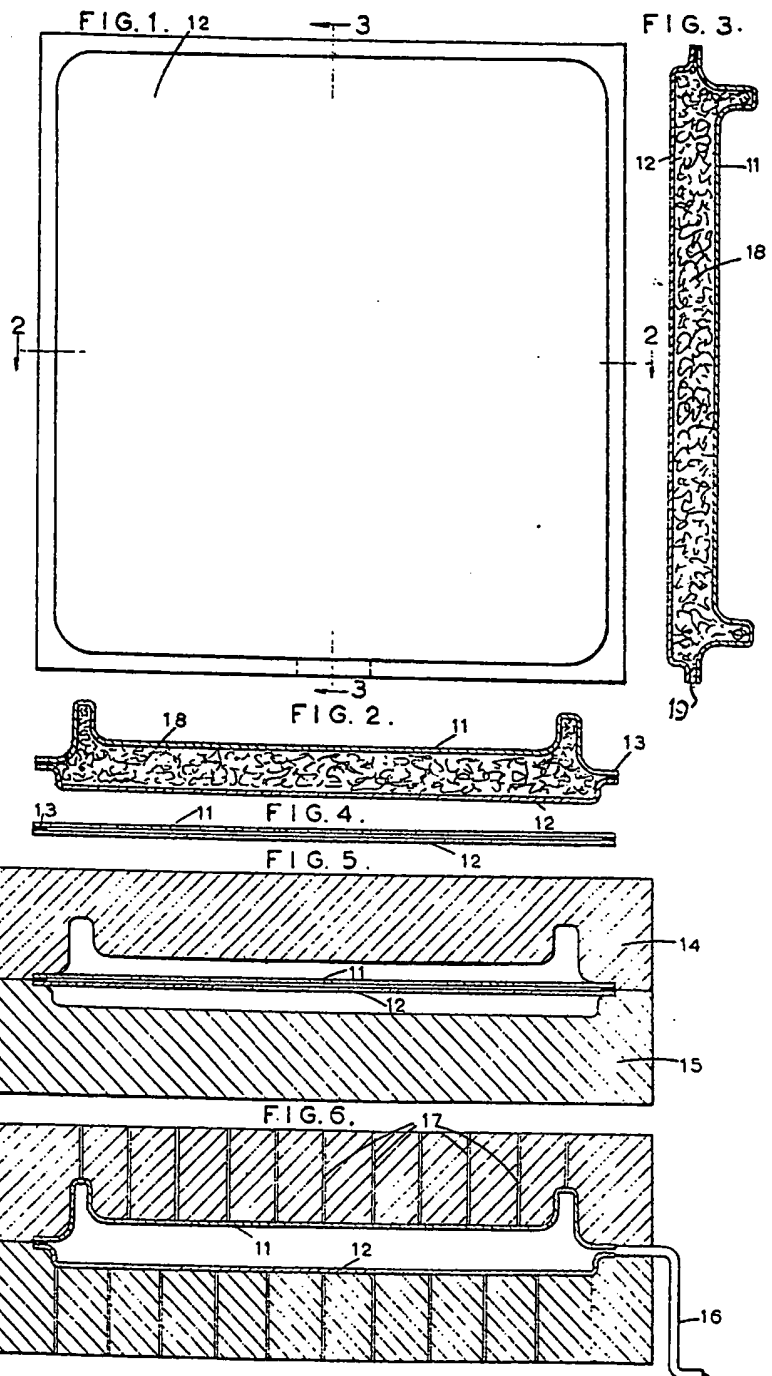
The insulation may be in the form of a foaming resin which is poured into the space between the panels and allowed to foam *in situ* completely to fill such space, and thereby greatly to reinforce the panels.

In this way there is provided a strong door which requires no further treatment such as painting, and which has a pleasing and attractive appearance.

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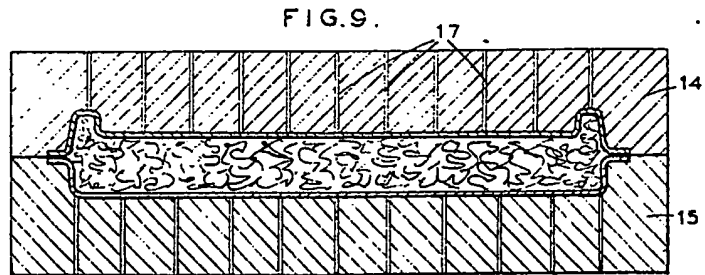
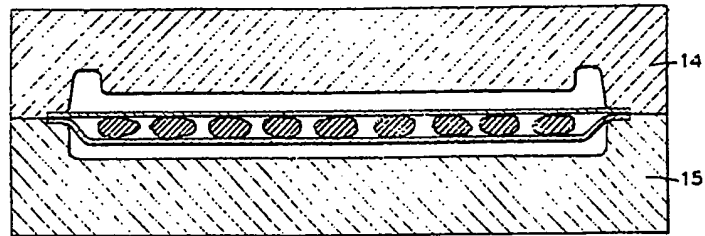
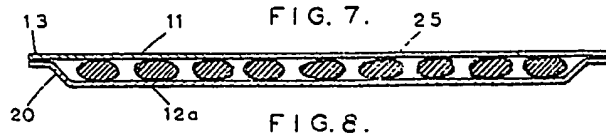
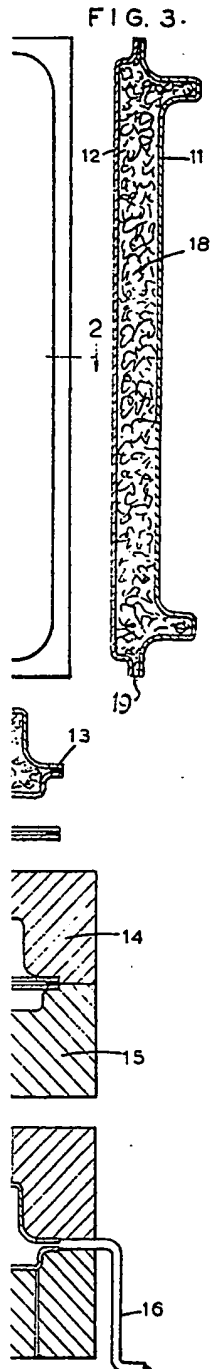


FIG. 11.

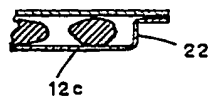


FIG. 12.

